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10/796,645	03/09/2004	Robert Malek	26114.13	2185

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EXAMINER	
QUASH, ANTHONY G	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/796,645	MALEK ET AL.	
	Examiner	Art Unit	
	Anthony Quash	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *see inside*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 12/9/05 and 3/20/06 was filed after the mailing date of the Non-Final Rejection on 10/18/05. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

Applicants' amendment to the drawings was received on 3/20/06. These drawings are acceptable.

Specification

Applicants' amendment to the specification has overcome the objection listed in the previous office action.

Response to Arguments

Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 3/20/06 have been fully considered but they are not persuasive with respect to claims 16-31. It is the examiner's view that the deceleration

lens (86), which is, located right before the ICR cell (87) does decelerates the beam immediately before the ions enter the cell. See Meek [4,686,365] fig. 7, col. 3 lines 53-60, col. 4 lines 5-11, col. 8 lines 55-62. The applicants' have stated that the gap between the deceleration lens (86) and the ICR cell (87) is a gap of significant size. However, the applicants' have not indicated where the reference states this. Therefore the examiner maintains the rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 5-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 recites the limitation "arranged to receive the electromagnet" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Improvement of the Electric Field in the Cylindrical Tapped-Ion Cell" by Naito et al, which from now on will be referred to as Naito.

With respect to claims 1-2,4 Naito teaches a measurement cell and magnet arrangement for an ion cyclotron resonance mass spectrometer, comprising a magnet assembly including a superconducting magnet (p. 180, second paragraph, p. 185, fourth paragraph) having a room temperature magnet bore (p. 185, fourth paragraph) with a longitudinal axis (fig. 3 p. 182), the superconducting magnet being arranged to generate a magnetic field with field lines that extent in a direction generally parallel with the longitudinal axis, an FT-ICR measurement cell arranged within he bore of the superconducting magnet, the cell having cell walls within which is defined a cell volume for receiving ions from an external ion source. See Naito pp. 179-180,182, 185. However, Naito does not explicitly state the ratio of the sectional area of the magnet bore to the sectional area of the cell volume, being less than 4.25. Naito does however, teach the diameter (55 mm) of the magnetic bore and the radius (16.5 mm) of the cell volume. See Naito fig. 3 and p. 185. The calculated areas for the bore and cell respectively are 23.75 cm2 and 8.55 cm2. When taken as a ratio with respect to one another, the ratio = 2.78. Therefore it is the examiner's view that Naito does indeed teach this aspect. Naito also teaches the length of the bore being less than 100 mm (p. 185).

With respect to claim 3, Naito teaches all aspects of the claim except for explicitly stating that the diameter of the bore be greater than 100 mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have diameter of the bore be greater than 100 mm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Claims 5-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Improvement of the Electric Field in the Cylindrical Tapped-Ion Cell" by Naito et al in view of O'Connor [6,720,555].

With respect to the 5, Naito teaches all aspects of the claim, however, it does not show a housing for receiving an electromagnet. See Naito fig. 3 and p. 185. It is inherent that the ICR apparatus would contain a housing for the magnets since it was well known to provide a housing in order to keep them cool so as to maintain there superconducting properties. O'Connor [6,720,555] is used here to show the housing. See O'Connor [6,720,555] figs. 3,5,7.

With respect to claim 6, O'Conner [6,720,555] teaches the magnet assembly electromagnet being a superconducting magnet, the housing acting as a cryostat in use to maintain windings of the electromagnet at a temperature below which they superconduct. See O'Conner [6,720,555] abstract, figs. 1-7, col. 1 lines 30-55, col. 2 lines 10-16,25-35,40- column 3, col. 4 lines 1-10,22-32,50-57, col. 5 lines 1-50, col. 6 lines 10-67, columns 7-8, col. 9 lines 5-20, col. 10 lines 1-15. Also see Naito fig. 3 and pp. 181-185.

As per claim 7, O'Conner [6,720,555] teaches an evacuable chamber, which receives the measurement cell, the evacuable chamber being arranged in use within the magnet bore. See O'Conner [6,720,555] abstract, figs. 1-7, col. 1 lines 30-55, col. 2 lines 10-16,25-35,40- column 3, col. 4 lines 1-10,22-32,50-57, col. 5 lines 1-50, col. 6 lines 10-67, columns 7-8, col. 9 lines 5-20, col. 10 lines 1-15.

As per claims 8-9, Naito in view of O'Conner [6,720,555] teach all aspects of the claims except for explicitly stating the axial centre of the measurement cell being arranged away from the geometric centre of the superconducting magnet in the axial direction, and that the superconducting magnet has an asymmetric winding so that the magnetic centre in the direction of the longitudinal axis of the magnetic bore being different from the geometric centre in that direction. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the axial centre of the measurement cell being arranged away from the geometric centre of the electromagnet in the axial direction, and that the electromagnet has an asymmetric winding so that the magnetic centre in the direction of the longitudinal axis of the magnetic bore being different from the geometric centre in that direction, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claims 10, Naito in view of O'Conner [6,720,555] teach all aspects of the claims except for explicitly stating the cell having a length of at least 70 mm in the direction of the longitudinal axis. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the cell to have a length of at least

70 mm in the direction of the longitudinal axis, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claims 11,13, O'Conner [6,720,555] teaches the measurement cell having a front face defining an opening through which the ions are received from the upstream direction, and wherein the measurement cell is cantilevered or supported from a location in that upstream direction. It also teaches the measurement cell having a rear face opposed to the front face, a plurality of electrodes to generate an electric field across the cell volume, and a detector means, the rear face including at least one external electrical contact adapted to engage with at least one of a corresponding power supply contact and/or detector signal processing means. See O'Conner [6,720,555] abstract, figs. 1-7, col. 1 lines 30-55, col. 2 lines 10-16,25-35,40- column 3, col. 4 lines 1-10,22-32,50-57, col. 5 lines 1-50, col. 6 lines 10-67, columns 7-8, col. 9 lines 5-20, col. 10 lines 1-15.

As per claims 12,14, Naito in view of O'Conner [6,720,555] teach all aspects of the claims except for explicitly stating that the measurement cell being movable relative to the magnetic assembly. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the measurement cell be movable relative to the magnetic assembly, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art. In addition, it would have been obvious to one of ordinary skill in the art to have the measurement cell be movable relative to the magnetic assembly in order to allow one to adjust cell so that it would be properly aligned therefore insuring that that majority of ions would analyzed.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meek [4,686,365] in view of Horning [2004/0217272] and further in view of Naito.

As per claim 15, Meek [4,686,365] discloses a mass spectrometer and method of mass of mass spectrometry, comprising generating ions from an ion source, guiding the ions into an ion trapping device, ion optics means to guide the ions from the source into the ion trapping device, an FT-ICR mass spectrometer having a measurement cell located within a bore of a magnet, the cell being downstream of a front face of that magnet, the FT-ICR mass spectrometer further comprising detector means to detect ions injected into the measurement cells, ion guiding means arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for the generation of a mass spectrum therein. Meek [4,686,365] also teaches the a potential being applied to accelerate the ions from the source to a kinetic energy E and to decelerate the ions at a location only immediately adjacent the front of the measurement cell, and downstream of the front face of the magnet. Meek [4,686,365] abstract, figs. 1-7, col. 2 lines 15-25, columns 3-4, col. 5 lines 35-45, col. 6 lines 15-65, col. 7 lines 1-10, 24-65, col. 8 lines 1-69, col. 9 lines 4-10,20-45, col. 11 lines 1-20, and col. 16 lines 65-69. With regards to the applicants' claim concerning there being a power supply for generating an electric field, it is the examiner's view that this is inherent. It is inherent to use a power supply to aid in generating an electric field. However, Meek [4,686,365] does not explicitly state the ion guiding means being arranged between the ion trapping device and the FT-ICR

mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum. Horning [2004/0217272] does teach ion guiding means (140) being arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum. See Horning [2004/0217272] paragraphs [0010, 0017, 0030, 0046, 0048]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have ion guiding means be arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum in order to insure that the ions reach the cell of the FT-ICR. In addition it was known that one way to improve mass resolution and accuracy in ion storage type devices is to control the ion population that is stored/trapped, and subsequently analyzed in the mass analyzer as taught in Horning [2004/0217272]. However, Meek [4,686,365] in view of Horning [2004/0217272] do not explicitly state the ratio of the sectional area of the magnet bore to the sectional area of the cell volume, each defined in a plane perpendicular to the longitudinal axis being less than 4.25. Naito does however, teach the diameter (55 mm) of the magnetic bore and the radius (16.5 mm) of the cell volume. See Naito fig. 3 and p. 185. The calculated areas for the bore and cell respectively are 23.75 cm2 and 8.55 cm2. When taken as a ratio with respect to one another, the ratio = 2.78. Therefore it is the examiner's view that Naito does indeed teach this aspect. In addition, Naito teaches the magnet assembly including a superconducting magnet, which has a room temperature magnet

bore. See Naito fig. 3 and p. 181-185. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the ratio of the sectional area of the magnet bore to the sectional area of the cell volume, each defined in a plane perpendicular to the longitudinal axis being less than 4.25, since it was known in the art to have the radii of the magnetic bore and cell to be sufficiently small.

Claims 16-31 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Meek [4,686,365] in view of Horning [2004/0217272].

As per claims 16,27, Meek [4,686,365] discloses a mass spectrometer and method of mass of mass spectrometry, comprising generating ions from an ion source, guiding the ions into an ion trapping device, ion optics means to guide the ions from the source into the ion trapping device, an FT-ICR mass spectrometer having a measurement cell located within a bore of a magnet, the cell being downstream of a front face of that magnet, the FT-ICR mass spectrometer further comprising detector means to detect ions injected into the measurement cells, ion guiding means arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for the generation of a mass spectrum therein. Meek [4,686,365] also teaches the a potential being applied to accelerate the ions from the source to a kinetic energy E and to decelerate the ions at a location only immediately adjacent the front of the measurement cell, and downstream of the front face of the magnet. Meek [4,686,365] also teaches detecting the ions within the measurement cell. See Meek [4,686,365] abstract, figs. 1-7, col. 2 lines 15-

25, columns 3-4, col. 5 lines 35-45, col. 6 lines 15-65, col. 7 lines 1-10, 24-65, col. 8 lines 1-69, col. 9 lines 4-10,20-45, col. 11 lines 1-20, and col. 16 lines 65-69. With regards to the applicants' claim concerning there being a power supply for generating an electric field, it is the examiner's view that this is inherent. It is inherent to use a power supply to aid in generating an electric field. However, Meek [4,686,365] does not explicitly state the ion guiding means being arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum. Horning [2004/0217272] does teach ion guiding means (140) being arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum. See Horning [2004/0217272] paragraphs [0010, 0017, 0030, 0046, 0048]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have ion guiding means be arranged between the ion trapping device and the FT-ICR mass spectrometer to guide the ions ejected from the trap into the FT-ICR mass spectrometer for generation of a mass spectrum in order to insure that the ions reach the cell of the FT-ICR. In addition it was known that one way to improve mass resolution and accuracy in ion storage type devices is to control the ion population that is stored/trapped, and subsequently analyzed in the mass analyzer as taught in Horning [2004/0217272].

As per claims 17,28, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating accelerating the ions to a kinetic

energy of in excess of 20eV for substantially all of the path from the ion trapping device to the location immediately in front of the measurement cell. Meek [4,686,365] does teach accelerating the ions to the location immediately in front of the measurement cell. See Meek [4,686,365] col. 3 line 50 – col. 4 line 25. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to accelerating the ions to a kinetic energy of in excess of 20eV for substantially all of the path from the ion trapping device to the location immediately in front of the measurement cell, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 18, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating accelerating the ions to a kinetic energy of in excess of 20eV for substantially all of the path from the ion source to the location immediately in front of the measurement cell. Meek [4,686,365] does teach accelerating the ions to the location immediately in front of the measurement cell. See Meek [4,686,365] col. 3 line 50 – col. 4 line 25. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to accelerating the ions to a kinetic energy of in excess of 20eV for substantially all of the path from the ion source to the location immediately in front of the measurement cell, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claims 19,29, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating accelerating the ions to a kinetic

energy of in excess of 50eV. It would have been obvious to one having ordinary skill in the art at the time the invention was made to accelerating the ions to a kinetic energy of in excess of 50eV, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claims 20,30-31, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating accelerating the ions to a kinetic energy, E, for at least 90% of the distance from the ion trapping device to the measurement cell or for at least 90% of the distance from the ion source to the measurement cell. It would have been obvious to one having ordinary skill in the art at the time the invention was made to accelerate the ions to a kinetic energy, E, for at least 90% of the distance from the ion trapping device to the measurement cell or for at least 90% of the distance from the ion source to the measurement cell, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 21, Meek [4,686,365] teaches the ion guiding means comprising at least one injection mulitpole ion guide. See Meek [4,686,365] figs. 2, 4a-4b, col. 2 line 65-col. 3 line 2, col. 4 lines 64-69.

As per claim 22, Meek [4,686,365] teaches the ion guide means comprising a plurality of injection multipole ion guide in series with one another. See Meek [4,686,365] figs. 2, 4a-4b, col. 2 line 65-col. 3 line 2, col. 4 lines 64-69. Also see Horning [2004/0217272] paragraphs [0046, 0048, 0066-0067, 0079, 0090].

As per claim 23, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating each injection multipole ion guide has a longitudinal axis, and wherein the alignment of the axis of each ion guide with a subsequent and/or preceding ion guide is less than about 0.1 mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have each injection multipole ion guide has a longitudinal axis, and wherein the alignment of the axis of each ion guide with a subsequent and/or preceding ion guide is less than about 0.1 mm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 24, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating the maximum radius of the inner volume of the ion guides being less than 4 mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the maximum radius of the inner volume of the ion guides be less than 4 mm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 25, Meek [4,686,365] in view of Horning [2004/0217272] teach all aspects of the claim except for explicitly stating the maximum radius of the inner volume of the ion guides being less than 2.9 mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the maximum radius of the inner volume of the ion guides be less than 2.9 mm, since it has been held that

discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 26, Meek [4,686,365] teaches the ion guiding means further comprising at least one lens for focusing the ions. See Meek [4,686,365] abstract, figs. 4a-4b. Also see Horning [2004/0217272] paragraphs [0046, 0048, 0066-0067, 0079, 0090].

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 6,727,699 to Kasten and 4,535,235 to McIver et al, are considered pertinent to the applicants' disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A. Quash
6/12/06

NIKITA WELLS
PRIMARY EXAMINER 06/12/06